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SODIUM FLUORALUMINATE AS A PESTICIDE FOR CONTROLLING WESTERN SPRUCE BUDWORM

(CHORISTONEURA OCCIDENTALIS FREE.)

FOREST INSECT AND DISEASE MANAGEMENT
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SODIUM FLUORALUMINATE AS A PESTICIDE FOR CONTROLLING WESTERN SPRUCE BUDWORM

(*Choristoneura occidentalis* Free.)

by

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Technical Report R2-8
December 1976

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INTRODUCTION

Sodium fluoraluminate (Kryocide (R)) is an inorganic stomach and contact poison insecticide which occurs naturally. Because of its low toxicity (LD_{50}=10,000 mg/kg) and its ability to control a variety of Lepidopterous larvae, Kryocide was evaluated as a possible pesticide to use against western spruce budworm (*Choristoneura occidentalis* Free.) infesting high valued ornamental Douglas-fir, *Pseudotsuga menziessi* (Mirb.) Franco, trees.

METHODS

A roadside plot (ca 150m X 20m) was established in mid June 1976 by the author in a moderately defoliated stand of Douglas-fir, on the north side of Sugarloaf Mountain in Colorado (T1N, R72W, Sec. 26, NW¼).

Ten Douglas-fir trees were selected for testing the effect of Kryocide on the budworm population. Two branches (40-45 cm in length) were removed from opposite sides of the midcrown at each sampling period. The branches removed from each tree were placed in a paper bag, sealed and labelled with the tree number and sample date. The branches were analyzed at the Lakewood Forest Insect and Disease Management laboratory within 48 hours of sampling. Data collected were budworm density and cm^2 of foliage. Population estimates are expressed in number of budworm larvae per 1000 cm^2 branch area.

Pre-spray sampling was done immediately prior to pesticide application on the plot. Post spray samples were collected four, seven, and 14 days after spraying. The budworm population was in the late fourth and early fifth stadia when the pesticide was applied.

Kryocide was applied at the rate of 2 lb active ingredient/100 gal water to the point of runoff. Application was with a Bean (Model 1010A) hydraulic sprayer equipped with a FMC 29 adjustable nozzle. Pressure was set at 200 psi.

150m = 164.04 yd
20m = 21.87 yd

40-45 cm = 15.75 - 17.72 in
1000 cm^2 = 155 sq. in.

RESULTS

The pesticide application resulted in 95 percent larval mortality (Table 1) by post spray day 14. A high standard error is associated with the post spray budworm density estimates, partially because no population was present on six trees after post spray day seven.

Population reduction was calculated using the ratio of two ratios method developed by Simmons and Chen.

Table 1 Mean density estimates (per 1000 cm^2 foliage) of western spruce budworm with sodium fluoraluminate.

	Pre Spray	Post Spray Day 4	Post Spray Day 7	Post Spray Day 14
Treatment	48.2 ± 21.5	8.3 ± 7.2	0.47 ± 0.7	0.6 ± 1.1
Check	35.9 ± 12.9	22.1 ± 11.8	15.5 ± 6.7	10.3 ± 3.8
% Reduction		72	98	95

± values are standard error

The check population data are from another study conducted on the same mountain as the study reported herein.

DISCUSSION

Gusts of wind hampered the spray operation. Trees which lacked the appearance of an even coat of spray deposit were resprayed later the same morning when the winds were calm. The initial uneven application of the Kryocide would have gone undetected if the product was colorless. Its off-white color allows the applicator to insure adequate coverage. The 95 percent mortality level that occurred appears to be satisfactory for protecting high valued trees. The three percent difference in the post spray sampling is probably due to sampling variation. Populations of less than one larvae per 1000 cm^2 of foliage are difficult to locate unless a deliberate search effort is conducted.

Some settling of the pesticide was noted after the spray pump engine was turned off. Whether this is typical of sodium fluoraluminate is unknown to the author. However, it appears advisable to use spray equipment which will provide thorough agitation of the pesticide as was the case in this test.

RECOMMENDATION

It is recommended that registration be sought with the Environmental Protection Agency to label sodium fluoraluminate (Kryocide) for use against the western spruce budworm at the rate of 2 lb a.i./100 gal water applied to individual trees to the point of runoff with ground application equipment.

REFERENCES

Simmons, G. A. and Chen, D. W. 1975. Approaches to Assessing Insecticide Efficacy in Spruce Budworm (Lepidoptera: Tortricidae) Control Programs. Can. Ent. 107:1205-1209.

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